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#10

SEQUENCE LISTING

<110> Burton, Dennis R
Barbas, Carlos F
Lerner, Richard A

<120> HUMAN NEUTRALIZING MONOCLONAL ANTIBODIES
TO HUMAN IMMUNODEFICIENCY VIRUS

<130> 313.2CON1

<140> US 10/016,986
<141> 2001-12-12

<150> US 09/149,898
<151> 1998-09-08

<150> US 08/899,575
<151> 1997-07-24

<150> US 08/276,852
<151> 1994-07-18

<150> US 08/178,302
<151> 1994-01-06

<150> PCT/US93/09328
<151> 1993-09-30

<150> US 07/954,148
<151> 1992-09-30

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Ala Gln Pro Ala Met Ala Gln Val Lys Leu
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tcgctgccca accagccatg gccgagctcg gtcggtcggt cctcgagggt cggtcggtct 180
ctagagttaa gcggccgc   198

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tcgctgccca accagccatg gcccaggtga aactgctcga gggtcggtcg gtctctagac 180

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gccgtaggca ataggtattt catggatcct tcctcctgtg tgaaattgtt atccgctcac 180
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Met Lys Thr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
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<400> 20
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<400> 22
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<400> 26
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<210> 27
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<400> 28
gagctcgtca gttctagagt taagcggccg 30

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gtatttcatt atgactgtct ccttggcgac tagtttagaa ttcaagct 48

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ttattcggtg tctttgcgtt tcttttatat gttgccacct ttatgtatgt attttctacg 600
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            20   25   30
Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly
        35   40   45
Ser Glu Gly Gly Gly Ser Gly Gly Gly Ser Gly Ser Gly Asp Phe Asp
    50   55   60
Tyr Glu Lys Met Ala Asn Ala Asn Lys Gly Ala Met Thr Glu Asn Ala
65   70   75   80
Asp Glu Asn Ala Leu Gln Ser Asp Ala Lys Gly Lys Leu Asp Ser Val
                85   90   95
Ala Thr Asp Tyr Gly Ala Ala Ile Asp Gly Phe Ile Gly Asp Val Ser
            100   105   110
Gly Leu Ala Asn Gly Asn Gly Ala Thr Gly Asp Phe Ala Gly Ser Asn
        115   120   125
Ser Gln Met Ala Gln Val Gly Asp Gly Asp Asn Ser Pro Leu Met Asn
    130   135   140
Asn Phe Arg Gln Tyr Leu Pro Ser Leu Pro Gln Ser Val Glu Cys Arg
145   150   155   160
Pro Phe Val Phe Ser Ala Gly Lys Pro Tyr Glu Phe Ser Ile Asp Cys
                165   170   175
Asp Lys Ile Asn Leu Phe Arg Gly Val Phe Ala Phe Leu Leu Tyr Val
            180   185   190
Ala Thr Phe Met Tyr Val Phe Ser Thr Phe Ala Asn Ile Leu Arg Asn
        195   200   205
Lys Glu Ser
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<211> 48
<212> DNA
<213> Artificial Sequence

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<400> 37
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accgagctcg aattcgtaat catggtc 27

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attaatgtga gttagctcac tcattaggca ccccaggctt tacactttat gcttccggct 120
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gattacgaat tcgagctcgg t 201

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<212> DNA
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caggtgcagc tcgagcagtc tggg 24

<210> 43
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<212> DNA
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<220>
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<400> 43
gaggtgcagc tcgaggagtc tggg 24

<210> 44
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<212> DNA
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<400> 44
gcatgtacta gttttgtcac aagatttggg 30

<210> 45
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<400> 45
gacatcgagc tcacccagtc tcca 24

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gaaattgagc tcacgcagtc tcca 24

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<400> 47
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<210> 48
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<210> 50
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<212> DNA
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attaaccctc actaaag 17

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<210> 53
<211> 128
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Val	Ser	Cys	Lys	Ala	Ser	Gly	Gly	Thr	Phe	Gly	Asp	Tyr	Ala	Ser	Asn
		20					25					30			
Tyr	Ala	Ile	Ser	Trp	Val	Arg	Gln	Ala	Pro	Gly	Gln	Gly	Leu	Glu	Tyr
	35					40					45				
Ile	Gly	Gly	Ile	Thr	Pro	Thr	Ser	Gly	Ser	Ala	Asp	Tyr	Ala	Gln	Lys
50					55					60					
Phe	Gln	Gly	Arg	Val	Thr	Ile	Ser	Ala	Asp	Arg	Phe	Thr	Pro	Ile	Leu
65				70					75						80
Tyr	Met	Glu	Leu	Arg	Ser	Leu	Arg	Ile	Glu	Asp	Thr	Ala	Ile	Tyr	Tyr
			85					90					95		
Cys	Ala	Arg	Glu	Arg	Arg	Glu	Arg	Gly	Trp	Asn	Pro	Arg	Ala	Leu	Arg
		100					105					110			
Gly	Ala	Leu	Asp	Phe	Trp	Gly	Gln	Gly	Thr	Arg	Val	Phe	Val	Ser	Pro
	115					120					125				

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<213> Artificial Sequence

<220>
<223> Synthesized

<400> 54

Leu	Glu	Glu	Ser	Gly	Ala	Ala	Val	Gln	Lys	Pro	Gly	Ser	Ser	Val	Arg
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Val	Ser	Cys	Gln	Ala	Ser	Gly	Gly	Thr	Phe	Asp	Asn	Phe	Ala	Ser	Asn
		20					25					30			
Tyr	Ala	Val	Ser	Trp	Val	Arg	Gln	Ala	Pro	Gly	Gln	Gly	Leu	Glu	Trp
	35					40					45				
Met	Gly	Gly	Ile	Thr	Pro	Thr	Ser	Gly	Thr	Ala	Thr	Tyr	Ser	Gln	Lys
50					55					60					
Phe	Gln	Gly	Arg	Val	Thr	Ile	Ser	Ala	Ala	Pro	Leu	Thr	Pro	Ile	Ile
65				70					75						80
Tyr	Met	Glu	Leu	Arg	Ser	Leu	Arg	Asp	Asp	Asp	Thr	Ala	Val	Tyr	Tyr
			85					90					95		
Cys	Ala	Arg	Glu	Arg	Arg	Glu	Arg	Gly	Trp	Asn	Pro	Arg	Ala	Leu	Val
		100					105					110			

Gly Ala Leu Asp Val Trp Gly Gln Gly Thr Thr Val
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<210> 55
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
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Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Gly Asp Tyr Ala Ser Asn
20 25 30
Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Tyr
35 40 45
Ile Gly Gly Ile Thr Pro Thr Ser Gly Ser Ala Asp Tyr Ala Gln Lys
50 55 60
Phe Gln Gly Arg Val Thr Ile Ser Ala Asp Arg Phe Thr Pro Ile Leu
65 70 75 80
Tyr Met Glu Leu Arg Ser Leu Arg Ile Glu Asp Thr Ala Ile Tyr Tyr
85 90 95
Cys Ala Arg Glu Arg Arg Glu Arg Gly Trp Asn Pro Arg Ala Leu Arg
100 105 110
Gly Ala Leu Asp Phe Trp Gly Gln Gly Thr Arg Val Phe Val Ser Pro
115 120 125

<210> 56
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 56
Leu Glu Glu Ser Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Lys
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Val Ser Cys Lys Ala Ser Gly Gly Ile Phe Ser Asp Phe Ala Ser Asn
20 25 30
Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Tyr
35 40 45
Met Gly Gly Ile Thr Pro Thr Ser Gly Ser Ala Asp Tyr Ala Gln Lys
50 55 60
Phe Gln Gly Arg Val Thr Ile Ser Ala Asp Ala Ala Thr Pro Arg Val
65 70 75 80
Tyr Met Glu Leu Arg Ile Leu Arg Ser Glu Asp Thr Ala Val Tyr Phe
85 90 95
Cys Ala Arg Glu Arg Arg Glu Arg Gly Trp Asn Pro Arg Ala Leu Arg
100 105 110
Gly Ala Leu Glu Val Trp Gly Gln Gly Thr Thr Val Ile Val Ser Pro
115 120 125

<210> 57
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<213> Artificial Sequence

<220>
<223> Synthesized

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Val Ser Cys Gln Ala Ser Gly Gly Thr Phe Asp Asn Phe Ala Ser Asn
            20   25   30
Tyr Ala Val Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp
        35   40   45
Met Gly Gly Ile Thr Pro Thr Ser Gly Thr Ala Thr Tyr Ser Gln Lys
    50   55   60
Phe Gln Gly Arg Val Thr Ile Ser Ala Ala Pro Leu Thr Pro Ile Ile
65   70   75   80
Tyr Met Glu Leu Arg Ser Leu Arg Asp Asp Asp Thr Ala Val Tyr Tyr
                85   90   95
Cys Ala Arg Glu Arg Arg Glu Arg Gly Trp Asn Pro Arg Ala Leu Val
            100   105   110
Gly Ala Leu Asp Val Trp Gly Gln Gly Thr Thr Val Ile Val Ser Ser
        115   120   125

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<220>
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            20   25   30
His Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Tyr
        35   40   45
Met Gly Gly Ile Thr Pro Thr Ser Gly Thr Ala Asp Tyr Ala Gln Lys
    50   55   60
Phe Gln Ala Arg Val Thr Ile Ser Ala His Glu Phe Thr Pro Ile Val
65   70   75   80
Tyr Met Glu Leu Arg Ser Leu Arg Ser Asp Gln His Ala Thr Tyr Tyr
                85   90   95
Cys Ala Thr Glu Arg Arg Glu Arg Gly Trp Asn Pro Arg Ala Leu Arg
            100   105   110
Gly Ala Leu Asp Ile Trp Gly Gln Gly Thr Thr Val Ile Val Ser Ser
        115   120   125

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<212> PRT
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<400> 59
Leu Glu Glu Ser Gly Gly Arg Leu Val Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Glu Gly Ser Gly Phe Thr Phe Thr Asn Ala Trp Met Thr
            20   25   30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile

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        35                  40                  45
Lys Ser Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
    50                  55                  60
Gly Arg Phe Ser Ile Ser Arg Asn Asp Leu Glu Asp Lys Met Phe Leu
65                  70                  75                  80
Glu Met Ser Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
                85                  90                  95
Thr Lys Tyr Pro Arg Tyr Ser Asp Met Val Thr Gly Val Arg Asn His
            100                 105                 110
Phe Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ile Val Ser Ser
        115                 120                 125


<210> 60
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<400> 60
Leu Glu Gln Ser Gly Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Arg
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Leu Ser Cys Glu Gly Ser Gly Phe Thr Phe Thr Asn Ala Trp Met Thr
            20                  25                  30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
        35                  40                  45
Lys Ser Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
    50                  55                  60
Gly Arg Phe Thr Ile Ser Arg Asn Asp Leu Glu Asp Lys Leu Phe Leu
65                  70                  75                  80
Glu Met Ser Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
                85                  90                  95
Thr Lys Tyr Pro Arg Tyr Phe Asp Met Met Ala Gly Val Arg Asn His
            100                 105                 110
Phe Tyr Met Asp Val Trp Gly Thr Gly Thr Thr Val Ile Val Ser Ser
        115                 120                 125


<210> 61
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 61
Leu Glu Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Arg
 1               5                  10                  15
Leu Ser Cys Glu Gly Ser Gly Phe Thr Phe Thr Asn Ala Trp Met Thr
            20                  25                  30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
        35                  40                  45
Lys Ser Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
    50                  55                  60
Gly Arg Phe Thr Ile Ser Arg Asn Asp Leu Glu Asp Lys Leu Phe Leu
65                  70                  75                  80
Glu Met Ser Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
                85                  90                  95
Thr Lys Tyr Pro Arg Tyr Ser Asp Met Met Ala Gly Val Arg Asn His
            100                 105                 110
```

Leu Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ile Val Ser Ser
115 120 125

<210> 62
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 62
Leu Glu Glu Ser Gly Gly Arg Leu Val Lys Pro Gly Gly Ser Leu Arg
1 5 10 15
Leu Ser Cys Glu Ala Ser Gly Phe Thr Phe Thr Asn Ser Trp Met Thr
20 25 30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
35 40 45
Lys Arg Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
50 55 60
Gly Arg Phe Ser Ile Ser Arg Asn Asp Leu Glu Asp Lys Met Phe Leu
65 70 75 80
Glu Met Ser Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
85 90 95
Thr Lys Tyr Pro Arg Tyr Ser Asp Met Met Thr Gly Val Arg Asn His
100 105 110
Phe Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ile Val Ser Ser
115 120 125

<210> 63
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 63
Leu Glu Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Arg
1 5 10 15
Leu Ser Cys Glu Ser Ser Gly Phe Thr Phe Thr Asn Ala Trp Met Thr
20 25 30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
35 40 45
Lys Ser Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
50 55 60
Gly Arg Phe Thr Ile Ser Arg Asn Asp Leu Glu Asp Lys Leu Phe Leu
65 70 75 80
Glu Met Ser Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
85 90 95
Thr Lys Tyr Pro Arg Tyr Ser Asp Met Met Ala Gly Val Arg Asn His
100 105 110
Phe Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ile Val Ser Ser
115 120 125

<210> 64
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 64
Leu Glu Glu Ser Gly Gly Arg Leu Val Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Glu Gly Ser Gly Phe Thr Phe Thr Asn Ala Trp Met Thr
            20   25   30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
        35   40   45
Lys Ser Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
    50   55   60
Gly Arg Phe Ser Ile Ser Arg Asn Asp Leu Glu Asp Lys Met Phe Leu
65   70   75   80
Glu Met Ser Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
                85   90   95
Thr Lys Tyr Pro Arg Tyr Ser Asp Met Met Thr Gly Val Arg Asn His
            100   105   110
Phe Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ile Val Ser Ser
        115   120   125

<210> 65
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 65
Leu Glu Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Ala Gly Ser Gly Phe Thr Phe Thr Asn Ala Trp Met Thr
            20   25   30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
        35   40   45
Lys Ser Lys Phe Asp Gly Gly Ser Ser His Tyr Pro Gly Pro Val Glu
    50   55   60
Gly Arg Phe Thr Ile Ser Arg Asn Tyr Ile Glu Asp Lys Leu Phe Leu
65   70   75   80
Glu Met Ser Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
                85   90   95
Thr Lys Tyr Pro Arg Tyr Tyr Asp Met Met Arg Gly Val Arg Asn His
            100   105   110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ile Val Ser Ser
        115   120   125

<210> 66
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 66
Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala Ser Val Lys
 1   5   10   15
Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn Phe Val Ile His
            20   25   30
Trp Val Arg Gln Ala Pro Gly Gln Arg Phe Glu Trp Met Gly Trp Ile

```
        35                  40                  45
Asn Pro Tyr Asn Gly Asn Lys Glu Phe Ser Ala Lys Phe Gln Asp Arg
    50                  55                  60
Val Thr Phe Thr Ala Asp Thr Ser Ala Asn Thr Ala Tyr Met Glu Leu
65                  70                  75                  80
Arg Ser Leu Arg Ser Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg Val
                85                  90                  95
Gly Pro Tyr Ser Trp Asp Asp Ser Pro Gln Asp Asn Tyr Tyr Met Asp
            100                 105                 110
Val Trp Gly Lys Gly Thr Thr Val Ile Val Ser Ser
        115                 120
```

<210> 67
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 67

```
Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala Ser Val Lys
 1               5                  10                  15
Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn Phe Val Ile His
            20                  25                  30
Trp Val Arg Gln Ala Pro Gly Gln Arg Phe Glu Trp Met Gly Trp Ile
        35                  40                  45
Asn Pro Tyr Asn Gly Asn Lys Glu Phe Ser Ala Lys Phe Gln Asp Arg
    50                  55                  60
Val Thr Phe Thr Ala Asp Thr Asp Ala Asn Thr Ala Tyr Met Glu Leu
65                  70                  75                  80
Arg Ser Leu Arg Ser Ala Asp Thr Ala Ile Tyr Tyr Cys Ala Arg Val
                85                  90                  95
Gly Pro Tyr Thr Trp Asp Asp Ser Pro Gln Asp Asn Tyr Tyr Met Asp
            100                 105                 110
Val Trp Gly Lys Gly Thr Lys Val Ile Val Ser Ser
        115                 120
```

<210> 68
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 68

```
Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala Ser Val Lys
 1               5                  10                  15
Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn Phe Val Ile His
            20                  25                  30
Trp Val Arg Gln Ala Pro Gly Gln Arg Phe Glu Trp Met Gly Trp Ile
        35                  40                  45
Asn Pro Tyr Asn Gly Asn Lys Glu Phe Ser Ala Lys Phe Gln Asp Arg
    50                  55                  60
Val Thr Phe Thr Ala Asp Thr Asp Ala Asn Thr Ala Tyr Met Glu Leu
65                  70                  75                  80
Arg Ser Leu Arg Ser Thr Asp Thr Ala Ile Tyr Tyr Cys Ala Arg Val
                85                  90                  95
Gly Pro Tyr Thr Trp Asp Asp Ser Pro Gln Asp Asn Tyr Tyr Met Asp
            100                 105                 110
```

Val Trp Gly Lys Gly Thr Lys Val Ile Val Ser Ser
115 120

<210> 69
<211> 130
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 69
Leu Glu Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Arg
1 5 10 15
Leu Ser Cys Val Gly Ser Gly Phe Thr Phe Ser Ser Ala Trp Met Ala
20 25 30
Trp Val Arg Gln Ala Pro Gly Arg Gly Leu Glu Trp Val Gly Leu Ile
35 40 45
Lys Ser Lys Ala Asp Gly Glu Thr Thr Asp Tyr Ala Thr Pro Val Lys
50 55 60
Gly Arg Phe Ser Ile Ser Arg Asn Asn Leu Glu Asp Thr Val Tyr Leu
65 70 75 80
Gln Met Asp Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95
Thr Gln Lys Pro Arg Tyr Phe Asp Leu Leu Ser Gly Gln Tyr Arg Arg
100 105 110
Val Ala Gly Ala Phe Asp Val Trp Gly His Gly Thr Thr Val Thr Val
115 120 125
Ser Pro
130

<210> 70
<211> 130
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 70
Leu Glu Glu Ser Gly Gly Gly Leu Val Lys Ala Gly Gly Ser Leu Arg
1 5 10 15
Leu Ser Cys Val Gly Ser Gly Phe Thr Phe Ser Ser Ala Trp Met Ala
20 25 30
Trp Val Gly Gln Ala Pro Gly Arg Gly Leu Glu Trp Val Gly Leu Ile
35 40 45
Lys Ser Lys Ala Asp Gly Glu Thr Thr Asp Tyr Ala Thr Pro Val Lys
50 55 60
Gly Arg Phe Ser Ile Ser Arg Asn Asn Leu Glu Asp Thr Val Tyr Leu
65 70 75 80
Gln Met Asp Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala
85 90 95
Thr Gln Lys Pro Arg Tyr Phe Asp Leu Leu Ser Gly Gln Tyr Arg Arg
100 105 110
Val Ala Gly Ala Phe Asp Val Trp Gly His Gly Thr Thr Val Thr Val
115 120 125
Ser Pro
130

<210> 71

<211> 130
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 71
Leu Glu Glu Ser Gly Gly Gly Leu Ile Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Val Gly Ser Gly Phe Thr Phe Ser Ser Ala Trp Met Thr
            20   25   30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Ile Gly Leu Ile
        35   40   45
Lys Ser Lys Ala Asp Gly Glu Thr Thr Asp Tyr Ala Thr Pro Val Lys
    50   55   60
Gly Arg Phe Thr Ile Ser Arg Asn Asn Leu Glu Asn Thr Val Tyr Leu
65   70   75   80
Gln Met Asp Ser Leu Arg Ala Asp Asp Thr Ala Val Tyr Tyr Cys Ala
                85   90   95
Thr Gln Lys Pro Ser Tyr Tyr Asn Leu Leu Ser Gly Gln Tyr Arg Arg
            100   105   110
Val Ala Gly Ala Phe Asp Val Trp Gly His Gly Thr Thr Val Thr Val
        115   120   125
Ser Pro
    130

<210> 72
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 72
Leu Glu Glu Ser Gly Glu Ala Val Val Gln Pro Gly Arg Ser Leu Arg
 1   5   10   15
Leu Ser Cys Ala Ala Ser Gly Phe Ile Phe Arg Asn Tyr Ala Met His
            20   25   30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Ile
        35   40   45
Lys Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg
    50   55   60
Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met
65   70   75   80
Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
                85   90   95
Ile Gly Leu Lys Gly Glu His Tyr Asp Ile Leu Thr Ala Tyr Gly Pro
            100   105   110
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115   120   125

<210> 73
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 73
Leu Glu Gln Ser Gly Glu Ala Val Val Gln Pro Gly Thr Ser Leu Arg
1 5 10 15
Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Asn Tyr Ala Met His
20 25 30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Ile
35 40 45
Lys Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg
50 55 60
Phe Ser Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Glu Met
65 70 75 80
Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
85 90 95
Ile Gly Leu Lys Gly Glu His Tyr Asp Ile Leu Thr Ala Tyr Gly Pro
100 105 110
Asp Tyr Trp Gly Gln Gly Ala Leu Val Thr Val Ser Ser
115 120 125

<210> 74
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 74
Leu Glu Gln Ser Gly Glu Ala Val Val Gln Pro Gly Arg Ser Leu Arg
1 5 10 15
Leu Ser Cys Ala Ala Ser Gly Phe Ile Phe Arg Asn Tyr Ala Met His
20 25 30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Ile
35 40 45
Lys Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg
50 55 60
Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met
65 70 75 80
Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
85 90 95
Ile Gly Leu Lys Gly Glu His Tyr Asp Ile Leu Thr Ala Tyr Gly Pro
100 105 110
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 75
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 75
Leu Glu Glu Ser Gly Glu Ala Val Val Gln Pro Gly Thr Ser Leu Arg
1 5 10 15
Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Asn Tyr Ala Met His
20 25 30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Ile
35 40 45
Lys Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg
50 55 60

```
Phe Ser Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Glu Met
65                  70                  75                  80
Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
                85                  90                  95
Ile Gly Leu Lys Gly Glu His Tyr Asp Ile Leu Thr Ala Tyr Gly Pro
            100                 105                 110
Asp Tyr Trp Gly Gln Gly Ala Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 76
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 76

```
Leu Glu Gln Ser Gly Glu Ala Val Val Gln Pro Gly Arg Ser Leu Arg
 1               5                  10                  15
Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Arg Asn Tyr Ala Met His
            20                  25                  30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Ile
        35                  40                  45
Lys Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg
    50                  55                  60
Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met
65                  70                  75                  80
Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
                85                  90                  95
Ile Gly Leu Lys Ala Glu His Tyr Asp Ile Leu Thr Ala Tyr Gly Pro
            100                 105                 110
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 77
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 77

```
Leu Glu Gln Ser Gly Glu Ala Val Val Gln Pro Gly Arg Ser Leu Arg
 1               5                  10                  15
Leu Ser Cys Ala Ala Ser Gly Phe Ile Phe Arg Asn Tyr Ala Met His
            20                  25                  30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Ile
        35                  40                  45
Lys Tyr Asp Gly Arg Asn Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg
    50                  55                  60
Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met
65                  70                  75                  80
Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp
                85                  90                  95
Ile Gly Leu Lys Gly Glu His Tyr Asp Ile Leu Thr Ala Tyr Gly Pro
            100                 105                 110
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 78
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 78
Leu Glu Gln Ser Gly Gly Gly Val Val Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Glu Gly Ser Gly Phe Thr Phe Pro Asn Ala Trp Met Thr
            20   25   30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
        35   40   45
Lys Ser Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
    50   55   60
Gly Arg Phe Thr Ile Ser Arg Asn Asp Leu Glu Asp Lys Val Phe Leu
65   70   75   80
Gln Met Asn Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
                85   90   95
Thr Arg Tyr Pro Arg Tyr Ser Glu Met Met Gly Gly Val Arg Lys His
            100   105   110
Phe Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ser Val Ser Ser
        115   120   125

<210> 79
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 79
Leu Glu Glu Ser Gly Gly Gly Val Val Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Glu Gly Ser Gly Phe Thr Phe Pro Asn Ala Trp Met Thr
            20   25   30
Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Val Ala Ser Ile
        35   40   45
Lys Ser Lys Phe Asp Gly Gly Ser Pro His Tyr Ala Ala Pro Val Glu
    50   55   60
Gly Arg Phe Thr Ile Ser Arg Asn Asp Leu Glu Asp Lys Val Phe Leu
65   70   75   80
Gln Met Asn Gly Leu Lys Ala Glu Asp Thr Gly Val Tyr Tyr Cys Ala
                85   90   95
Thr Arg Tyr Pro Arg Tyr Ser Glu Met Met Gly Gly Val Arg Lys His
            100   105   110
Phe Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Ser Val Ser Ser
        115   120   125

<210> 80
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 80
Leu Glu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg Ser Leu Arg
 1   5   10   15
Val Ser Cys Glu Ala Ser Gly Phe Thr Phe Ser Ser Tyr Glu Met Asn
            20   25   30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ser Gln Ile
        35   40   45
Ser Ser Ser Gly Ser Arg Thr Tyr Tyr Ala Asp Ser Val Lys Gly Arg
    50   55   60
Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr Leu Glu Met
65   70   75   80
Thr Ser Leu Arg Val Asp Asp Thr Ala Val Tyr Tyr Cys Ala Arg Gly
                85   90   95
Arg Arg Leu Val Thr Phe Gly Gly Val Val Ser Gly Gly Asn Ile Trp
            100   105   110
Gly Gln Gly Thr Met Val Thr Val Ser Ser
        115   120

<210> 81
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 81
Leu Glu Gln Ser Gly Gly Gly Val Val Gln Pro Gly Arg Ser Leu Arg
 1   5   10   15
Leu Ser Cys Ala Gly Ser Gly Phe Asn Phe Ser Asp Asp Thr Met His
            20   25   30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Val Ile
        35   40   45
Ser Tyr Glu Gly Ser Asp Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg
    50   55   60
Phe Thr Ile Ser Arg Asp Asn Ser Glu Asn Thr Leu Tyr Leu Gln Met
65   70   75   80
Asp Ser Leu Arg Ala Asp Asp Thr Ala Leu Tyr Tyr Cys Ala Arg Asn
                85   90   95
Thr Arg Glu Asn Ile Glu Ala Asp Gly Thr Ala Tyr Tyr Ser Tyr Tyr
            100   105   110
Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
        115   120   125

<210> 82
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 82
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
 1   5   10   15
Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Asn Tyr Leu Ala
            20   25   30
Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Arg Leu Leu Ile Tyr Ala
        35   40   45
Ala Ser Thr Leu Gln Pro Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
    50   55   60

Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65 70 75 80
Val Ala Thr Tyr Tyr Cys Gln Lys Tyr Asn Ser Ala Pro Arg Thr Phe
85 90 95
Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr
100 105

<210> 83
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 83
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Ile Gly Asp Arg
1 5 10 15
Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Asn Asn Tyr Leu Ala
20 25 30
Trp Tyr Gln Gln Arg Pro Gly Lys Val Pro Arg Leu Leu Ile Tyr Ala
35 40 45
Ala Ser Thr Leu Gln Ser Gly Val Pro Thr Arg Phe Ser Gly Ser Gly
50 55 60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65 70 75 80
Val Ala Thr Tyr Tyr Cys Gln Lys Tyr Asn Ser Val Pro Arg Thr Phe
85 90 95
Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
100 105

<210> 84
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 84
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
1 5 10 15
Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Asn Tyr Leu Ala
20 25 30
Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Lys Leu Leu Ile Tyr Ala
35 40 45
Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
50 55 60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65 70 75 80
Val Ala Thr Tyr Tyr Cys Gln Lys Tyr Asn Ser Ala Pro Arg Thr Phe
85 90 95
Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr
100 105

<210> 85
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 85
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Ile Gly Asp Arg
 1   5   10   15
Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Asn Asn Tyr Leu Ala
            20   25   30
Trp Tyr Gln Gln Arg Pro Gly Lys Ala Pro Asn Leu Leu Ile Tyr Ala
        35   40   45
Ala Ser Thr Leu Gln Ser Gly Val Pro Pro Arg Phe Ser Gly Ser Gly
    50   55   60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65   70   75   80
Val Ala Thr Tyr Tyr Cys Gln Lys Tyr Asn Ser Val Pro His Thr Phe
                85   90   95
Gly Gly Gly Thr Lys Val Glu Ile Lys Arg
            100   105

<210> 86
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 86
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
 1   5   10   15
Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ile Ser Asn Tyr Leu
            20   25   30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
        35   40   45
Gly Val Ser Asn Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50   55   60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
65   70   75   80
Asp Phe Ala Val Tyr Ser Cys Gln Gln Tyr Gly Thr Ser Pro Trp Thr
                85   90   95
Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr
            100   105

<210> 87
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 87
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
 1   5   10   15
Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Asn Asn Tyr Leu
            20   25   30
Ala Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
        35   40   45
Gly Ala Ser Asn Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50   55   60
Gly Ser Gly Thr Ala Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu

65 70 75 80
Asp Val Ala Ile Tyr Tyr Cys Gln Gln Tyr His Ser Ser Pro Tyr Thr
85 90 95
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
100 105

<210> 88
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 88
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
1 5 10 15
Ala Thr Leu Ser Cys Arg Ala Ser His Arg Val Asn Asn Asn Phe Leu
20 25 30
Ala Trp Tyr Gln Gln Lys Pro Gln Ala Pro Arg Leu Leu Ile Ser Gly
35 40 45
Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly
50 55 60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Asp Asp
65 70 75 80
Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Asp Ser Pro Leu Tyr Ser
85 90 95
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
100 105

<210> 89
<211> 105
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 89
Glu Leu Thr Gln Ser Pro Ala Ser Val Ser Ala Ser Val Gly Asp Thr
1 5 10 15
Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Ile His Asn Trp Leu Ala
20 25 30
Trp Tyr Gln Gln Gln Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala
35 40 45
Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Arg Gly
50 55 60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65 70 75 80
Phe Ala Thr Tyr Tyr Cys Gln Gln Gly Asn Ser Phe Pro Lys Phe Gly
85 90 95
Pro Gly Thr Val Val Asp Ile Lys Arg
100 105

<210> 90
<211> 107
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthesized

<400> 90
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
1 5 10 15
Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Leu Ser Asn Asn Tyr Leu
20 25 30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
35 40 45
Gly Ser Ser Thr Arg Gly Thr Gly Ile Pro Asp Arg Phe Ser Gly Gly
50 55 60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
65 70 75 80
Asp Phe Ala Val Tyr Tyr Cys Gln His Tyr Gly Asn Ser Val Tyr Thr
85 90 95
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
100 105

<210> 91
<211> 104
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 91
Gln Ser Pro Asp Thr Leu Ser Leu Asn Pro Gly Glu Arg Ala Thr Leu
1 5 10 15
Ser Cys Arg Ala Ser His Arg Ile Ser Ser Lys Arg Leu Ala Trp Tyr
20 25 30
Gln His Lys Arg Gly Gln Ala Pro Arg Leu Leu Ile Tyr Val Cys Pro
35 40 45
Asn Arg Ala Gly Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly
50 55 60
Thr Asp Phe Thr Leu Thr Tyr Ser Arg Leu Glu Pro Glu Asp Phe Ala
65 70 75 80
Met Tyr Tyr Cys Gln Tyr Tyr Gly Gly Ser Ser Tyr Thr Phe Gly Gln
85 90 95
Gly Thr Lys Val Glu Ile Thr Arg
100

<210> 92
<211> 104
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 92
Gln Ser Pro Ser His Leu Ser Leu Ser Pro Gly Glu Arg Ala Ile Leu
1 5 10 15
Ser Cys Arg Ala Ser Gln Arg Val Ser Ala Pro Tyr Leu Ala Trp Tyr
20 25 30
Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Val Ile Tyr Gly Ala Ser
35 40 45
Thr Arg Ala Thr Asp Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly
50 55 60
Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala
65 70 75 80

Ile Tyr Tyr Cys Gln Val Tyr Gly Gln Ser Pro Val Leu Phe Gly Gln
85 90 95
Gly Thr Lys Leu Glu Met Lys Arg
100

<210> 93
<211> 105
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 93
Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Asp Arg Ala Thr Leu
1 5 10 15
Ser Cys Arg Ala Ser Gln Ser Leu Ser Ser Ser Phe Leu Ala Trp Tyr
20 25 30
Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Ser Ala Ser
35 40 45
Met Arg Ala Thr Gly Ile Pro Asp Arg Phe Arg Gly Ser Val Ser Gly
50 55 60
Thr Asp Phe Thr Leu Thr Ile Thr Arg Leu Glu Pro Glu Asp Phe Ala
65 70 75 80
Val Tyr Tyr Cys Gln Arg Phe Gly Thr Ser Pro Leu Tyr Thr Phe Gly
85 90 95
Gln Gly Thr Lys Leu Glu Met Lys Arg
100 105

<210> 94
<211> 104
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 94
Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu
1 5 10 15
Ser Cys Arg Ala Ser Gln Ser Phe Ser Ser Asn Phe Leu Ala Trp Tyr
20 25 30
Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Val His Pro
35 40 45
Asn Arg Ala Thr Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly
50 55 60
Thr Asp Phe Thr Leu Thr Ile Arg Arg Leu Glu Pro Glu Asp Phe Ala
65 70 75 80
Val Tyr Tyr Cys Gln Gln Tyr Gly Ala Ser Leu Val Ser Phe Gly Pro
85 90 95
Gly Thr Lys Val His Ile Lys Arg
100

<210> 95
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 95
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
 1   5   10   15
Ala Thr Phe Ser Cys Arg Ser Ser His Ser Ile Arg Ser Arg Arg Val
            20   25   30
Ala Trp Tyr Gln His Lys Pro Gly Gln Ala Pro Arg Leu Val Ile His
        35   40   45
Gly Val Ser Asn Arg Ala Ser Gly Ile Ser Asp Arg Phe Ser Gly Ser
    50   55   60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Val Glu Pro Glu
65   70   75   80
Asp Phe Ala Leu Tyr Tyr Cys Gln Val Tyr Gly Ala Ser Ser Tyr Thr
                85   90   95
Phe Gly Gln Gly Thr Lys Leu Glu Arg Lys Arg Thr
            100   105

<210> 96
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 96
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Thr Pro Gly Glu Arg
 1   5   10   15
Ala Thr Leu Ser Cys Arg Thr Ser His Ser Ile Arg Ser Arg Arg Leu
            20   25   30
Ala Trp Tyr Gln Val Lys Gly Gly Gln Ala Pro Arg Leu Leu Ile Tyr
        35   40   45
Gly Val Ser Asn Arg Ala Gly Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50   55   60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
65   70   75   80
Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Arg Tyr Thr
                85   90   95
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
            100   105

<210> 97
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 97
Glu Leu Thr Gln Ala Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
 1   5   10   15
Ala Thr Phe Ser Cys Arg Ser Ser His Ser Ile Arg Ser Arg Arg Val
            20   25   30
Arg Trp Tyr Gln His Lys Pro Gly Gln Ala Pro Arg Leu Val Ile His
        35   40   45
Gly Val Ser Asn Arg Ala Ser Gly Ile Ser Asp Arg Phe Ser Gly Ser
    50   55   60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Val Glu Pro Glu
65   70   75   80
Asp Phe Ala Leu Tyr Tyr Cys Gln Val Tyr Gly Ala Ser Ser Tyr Thr

85 90 95
Phe Gly Gln Gly Thr Lys Leu Glu Arg Lys Arg
100 105

<210> 98
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 98
Glu Leu Thr Gln Ala Pro Gly Thr Leu Ser Leu Ser Pro Gly Asp Arg
1 5 10 15
Ala Thr Phe Ser Cys Arg Ser Ser His Asn Ile Arg Ser Arg Arg Val
20 25 30
Ala Trp Tyr Gln His Lys Pro Gly Gln Ala Pro Arg Leu Val Ile His
35 40 45
Gly Val Ser Asn Arg Ala Ser Gly Ile Ser Asp Arg Phe Ser Gly Ser
50 55 60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Leu Glu Pro Glu
65 70 75 80
Asp Phe Ala Leu Tyr Tyr Cys Gln Val Tyr Gly Ala Ser Ser Tyr Thr
85 90 95
Phe Gly Gln Gly Thr Lys Leu Asp Phe Lys Arg Thr
100 105

<210> 99
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 99
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
1 5 10 15
Ala Thr Leu Ser Cys Arg Ala Gly Gln Ser Ile Ser Ser Asn Tyr Leu
20 25 30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
35 40 45
Gly Ala Ser Asn Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60
Gly Ser Gly Thr Asp Phe Thr Leu Ser Ile Ser Arg Leu Glu Pro Glu
65 70 75 80
Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Tyr Thr
85 90 95
Phe Gly Gln Gly Thr Gln Leu Asp Ile Lys Arg Thr
100 105

<210> 100
<211> 104
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 100
Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu
 1   5   10   15
Ser Cys Arg Ala Ser Gln Ser Leu Ser Asn Asn Tyr Leu Ala Trp Tyr
            20   25   30
Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ser Ser
        35   40   45
Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Gly Gly Ser Gly
    50   55   60
Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala
65   70   75   80
Val Tyr Tyr Cys Gln Gln Tyr Gly Asn Ser Val Tyr Thr Phe Gly Gln
                85   90   95
Gly Thr Lys Leu Glu Ile Lys Arg
            100

<210> 101
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 101
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
 1   5   10   15
Val Thr Ile Thr Cys Arg Thr Ser Gln Gly Ile Ser Asn Tyr Leu Ala
            20   25   30
Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Lys Leu Leu Ile Tyr Gly
        35   40   45
Ala Ser Thr Leu Gln Ser Gly Gly Pro Ser Arg Phe Ser Gly Ser Gly
    50   55   60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Asn Ser Leu Gln Pro Glu Asp
65   70   75   80
Val Ala Thr Tyr Ser Cys Gln Asn Tyr Asp Ser Ala Pro Trp Thr Phe
                85   90   95
Gly Gln Gly Thr Lys Val Asp Ile Lys Arg
            100   105

<210> 102
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 102
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
 1   5   10   15
Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Asn Tyr Leu Asn
            20   25   30
Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala
        35   40   45
Ala Ser Ser Leu Gln Arg Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
    50   55   60
Ser Gly Thr Asp Phe Thr Leu Ser Ile Ser Ser Leu Gln Pro Glu Asp
65   70   75   80
Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Ile Pro Pro Leu Thr
                85   90   95

Phe Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr
100 105

<210> 103
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 103
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
1 5 10 15
Val Thr Ile Thr Cys Arg Ala Ser Gln Asn Ile Asn Asn Tyr Leu Asn
20 25 30
Trp Tyr Gln Gln Lys Pro Gly Glu Ala Pro Lys Leu Leu Ile His Thr
35 40 45
Ala Phe Asn Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Thr Ala
50 55 60
Ser Gly Thr Glu Phe Thr Leu Thr Ile Arg Ser Leu Gln Pro Glu Asp
65 70 75 80
Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Tyr Thr Phe
85 90 95
Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr
100 105

<210> 104
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 104
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
1 5 10 15
Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr Leu Asn
20 25 30
Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala
35 40 45
Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
50 55 60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65 70 75 80
Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Tyr Thr Phe
85 90 95
Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
100 105

<210> 105
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 105

```
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
 1               5                  10                  15
Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser Ser Tyr Leu Asn
            20                  25                  30
Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala
        35                  40                  45
Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
    50                  55                  60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65                  70                  75                  80
Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Gln Thr Phe
                85                  90                  95
Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
            100                 105
```

<210> 106
<211> 104
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 106

```
Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile
 1               5                  10                  15
Thr Cys Arg Ala Ser Gln Thr Ile Ser Ser Tyr Leu Asn Trp Tyr Gln
            20                  25                  30
Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Ser
        35                  40                  45
Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Gly Gly Ser Gly Thr
    50                  55                  60
Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr
65                  70                  75                  80
Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Tyr Thr Phe Gly Gln Gly
                85                  90                  95
Thr Lys Leu Glu Ile Lys Arg Thr
            100
```

<210> 107
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 107

```
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
 1               5                  10                  15
Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Arg Asn Tyr Leu Asn
            20                  25                  30
Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Asp
        35                  40                  45
Ala Ser Asn Ser Glu Thr Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
    50                  55                  60
Ser Gly Arg Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp
65                  70                  75                  80
Val Ala Thr Tyr Tyr Cys Gln Gln His Gln Asn Val Pro Leu Thr Phe
                85                  90                  95
Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr
```

100 105

<210> 108
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 108
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
1 5 10 15
Val Thr Ile Thr Cys Gln Ala Ser Gln Asp Ile Ser Asn His Leu Asn
20 25 30
Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Asp
35 40 45
Ala Ser Asn Leu Glu Thr Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
50 55 60
Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp
65 70 75 80
Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Asp Asn Leu Pro Leu Thr Phe
85 90 95
Gly Gly Gly Thr Lys Val Glu Ile Lys Arg Thr
100 105

<210> 109
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 109
Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg
1 5 10 15
Ile Thr Ile Thr Cys Arg Ala Ser Gln Thr Ile Asn Asn Tyr Leu Asn
20 25 30
Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Gly
35 40 45
Ala Ser Asn Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly
50 55 60
Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp
65 70 75 80
Phe Ala Thr Tyr Phe Cys Gln Gln Ser Tyr Asn Thr Pro Pro Trp Thr
85 90 95
Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr
100 105

<210> 110
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 110
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg

```
 1               5                  10                  15
Ala Thr Leu Ser Cys Arg Ala Ser Gln Arg Val Asn Ser Asn Tyr Leu
            20                  25                  30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Thr Pro Arg Val Val Ile Tyr
        35                  40                  45
Ser Thr Ser Arg Arg Ala Thr Gly Val Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
65                  70                  75                  80
Asp Phe Ala Val Tyr Tyr Cys Gln Gln Phe Gly Asp Ala Gln Tyr Thr
                85                  90                  95
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr
            100                 105
```

<210> 111
<211> 93
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 111

```
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Arg Val Asn Ser Asn
 1               5                  10                  15
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Thr Pro Arg Val Val
            20                  25                  30
Ile Tyr Ser Thr Ser Arg Arg Ala Thr Gly Val Pro Asp Arg Phe Ser
        35                  40                  45
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
    50                  55                  60
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Phe Gly Asp Ala Gln
65                  70                  75                  80
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
                85                  90
```

<210> 112
<211> 104
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 112

```
Thr Gln Ser Pro Ser Ser Val Ser Ala Ser Val Gly Asp Thr Val Thr
 1               5                  10                  15
Phe Thr Cys Arg Ala Ser Gln Asp Ile Arg Asn Tyr Leu Asn Trp Tyr
            20                  25                  30
His Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Ser Asp Ala Ser
        35                  40                  45
Asp Leu Glu Ile Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Ala
    50                  55                  60
Thr Tyr Phe Ser Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp Ile Gly
65                  70                  75                  80
Thr Tyr Tyr Cys Gln Gln Tyr Ala Asp Leu Ile Thr Phe Gly Gly Gly
                85                  90                  95
Thr Lys Val Glu Ile Lys Arg Thr
            100
```

<210> 113
<211> 96
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 113
Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val
 1   5   10   15
Gly Thr Asn Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg
            20   25   30
Leu Leu Ile Phe Asp Ala Ser Thr Arg Asp Thr Tyr Ile Pro Asp Thr
        35   40   45
Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Ala Leu Thr Ile Ser Ser
    50   55   60
Leu Gln Ser Glu Asp Phe Gly Phe Tyr Tyr Cys Gln Gln Tyr Asp Asn
65   70   75   80
Trp Pro Pro Thr Phe Gly Gln Gly Thr Lys Leu Glu Val Lys Arg Thr
                85   90   95

<210> 114
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 114
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Asp Arg
 1   5   10   15
Ala Thr Phe Ser Cys Arg Ser Ser His Asn Ile Arg Ser Arg Arg Val
            20   25   30
Ala Trp Tyr Gln His Lys Pro Gly Gln Ala Pro Arg Leu Val Ile His
        35   40   45
Gly Val Ser Asn Arg Ala Ser Gly Ile Ser Asp Arg Phe Ser Gly Ser
    50   55   60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Leu Glu Pro Glu
65   70   75   80
Asp Phe Ala Leu Tyr Tyr Cys Gln Val Tyr Gly Ala Ser Ser Tyr Thr
                85   90   95
Phe Gly Gln Gly Thr Lys Leu Asp Phe Lys Arg
            100   105

<210> 115
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 115
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg
 1   5   10   15
Ala Thr Phe Ser Cys Arg Ser Ser His Asn Ile Arg Ser Arg Arg Val
            20   25   30
Ala Trp Tyr Gln His Lys Pro Gly Gln Ala Pro Arg Leu Val Ile His
        35   40   45

```
Gly Val Ser Asn Arg Ala Thr Gly Ile Ser Asp Arg Phe Ser Gly Ser
    50                  55                  60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Leu Glu Pro Glu
65                  70                  75                  80
Asp Phe Ala Leu Tyr Tyr Cys Gln Val Tyr Gly Ala Ser Ser Tyr Thr
                85                  90                  95
Phe Gly Gln Gly Thr Lys Leu Asp Phe Lys Arg
            100                 105
```

<210> 116
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 116

```
Glu Leu Thr Gln Ser Pro Asp Thr Leu Ser Leu Asn Val Gly Glu Arg
 1               5                  10                  15
Ala Thr Leu Ser Cys Arg Ala Ser His Arg Ile Ser Ser Arg Arg Leu
            20                  25                  30
Ala Trp Tyr Gln His Lys Arg Gly Gln Ala Pro Arg Leu Leu Ile Tyr
        35                  40                  45
Gly Val Ser Ser Arg Ala Gly Gly Val Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60
Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Arg Leu Glu Pro Glu
65                  70                  75                  80
Asp Phe Ala Met Tyr Tyr Cys Gln Thr Tyr Gly Gly Ser Ser Tyr Thr
                85                  90                  95
Phe Gly Gln Gly Thr Lys Val Asp Ile Lys Arg
            100                 105
```

<210> 117
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 117

```
Glu Leu Thr Gln Ser Pro Asp Thr Leu Ser Leu Asn Ala Gly Glu Arg
 1               5                  10                  15
Ala Thr Leu Ser Cys Arg Ala Ser His Arg Ile Ser Ser Arg Arg Leu
            20                  25                  30
Ala Trp Tyr Gln His Lys Arg Gly Gln Ala Pro Arg Leu Leu Ile Tyr
        35                  40                  45
Gly Val Ser Asn Arg Ala Gly Gly Val Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60
Gly Ser Gly Thr Asp Phe Ser Leu Thr Ile Ser Arg Leu Glu Pro Glu
65                  70                  75                  80
Asp Phe Ala Ile Tyr Tyr Cys Gln Thr Tyr Gly Gly Ser Ser Tyr Thr
                85                  90                  95
Phe Gly Gln Gly Thr Thr Val Asp Ile Lys Arg
            100                 105
```

<210> 118
<211> 107
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthesized

<400> 118
Glu Leu Thr Gln Ser Pro Asp Thr Leu Ser Leu Asn Thr Gly Glu Arg
1 5 10 15
Ala Thr Leu Ser Cys Arg Ala Ser His Arg Ile Gly Ser Arg Arg Leu
20 25 30
Ala Trp Tyr Gln His Arg Arg Gly Gln Ala Pro Arg Leu Leu Ile Tyr
35 40 45
Gly Val Ser Asn Arg Ala Gly Gly Val Pro Asp Arg Phe Ser Gly Ser
50 55 60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
65 70 75 80
Asp Phe Ala Ile Tyr Tyr Cys Gln Thr Tyr Gly Gly Ser Ser Tyr Thr
85 90 95
Phe Gly Gln Gly Thr Lys Val Asp Ile Lys Arg
100 105

<210> 119
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 119
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Thr Pro Gly Glu Arg
1 5 10 15
Ala Ile Leu Ser Cys Lys Thr Ser His Asn Ile Trp Ser Arg Arg Leu
20 25 30
Ala Trp Tyr Gln Leu Lys Ser Gly Gln Ala Pro Arg Leu Leu Ile Tyr
35 40 45
Gly Val Ser Lys Arg Ala Gly Gly Ile Pro Asp Arg Phe Ser Gly Ser
50 55 60
Gly Ser Ala Thr Asp Phe Thr Leu Thr Ile Ser Arg Val Glu Pro Glu
65 70 75 80
Asp Phe Ala Val Tyr Tyr Cys Gln Thr Tyr Gly Gly Ser Ala Tyr Thr
85 90 95
Phe Gly Gln Gly Thr Lys Leu Asp Ile Lys Arg
100 105

<210> 120
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 120
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Thr Pro Gly Glu Arg
1 5 10 15
Ala Ile Leu Ser Cys Lys Thr Ser His Asn Ile Trp Ser Arg Arg Leu
20 25 30
Ala Trp Tyr Gln Leu Lys Ser Gly Gln Ala Pro Arg Leu Leu Ile Tyr
35 40 45
Gly Val Ser Lys Arg Ala Gly Gly Ile Pro Asp Arg Phe Ser Gly Ser

```
    50                  55                  60
Gly Ser Ala Thr Asp Phe Thr Leu Thr Ile Ser Arg Val Glu Pro Glu
65                  70                  75                  80
Asp Phe Ala Val Tyr Tyr Cys Gln Thr Tyr Gly Gly Ser Ala Tyr Thr
                85                  90                  95
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
            100                 105


<210> 121
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 121
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Ser Thr Pro Gly Glu Arg
 1               5                  10                  15
Ala Ile Leu Ser Cys Lys Thr Ser His Asn Ile Trp Ser Arg Arg Leu
            20                  25                  30
Ala Trp Tyr Gln Val Lys Ser Gly Leu Pro Pro Arg Leu Leu Ile His
        35                  40                  45
Gly Val Ser Arg Arg Ala Gly Gly Ile Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60
Gly Ser Ala Arg Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Ala
65                  70                  75                  80
Asp Phe Ala Val Tyr Tyr Cys Gln Thr Tyr Gly Gly Ser Ser Tyr Ser
                85                  90                  95
Phe Gly Gln Gly Thr Lys Leu Asp Phe Asn Arg
            100                 105


<210> 122
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 122
Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Asn Pro Gly Glu Arg
 1               5                  10                  15
Ala Val Leu Ser Cys Arg Thr Ser Arg Asn Ile Trp Ser Arg Arg Leu
            20                  25                  30
Ala Trp Tyr Gln Val Arg Arg Gly Gln Ala Pro Arg Leu Leu Ile His
        35                  40                  45
Gly Val Ser Lys Arg Ala Gly Gly Val Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60
Gly Ser Ala Arg Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu
65                  70                  75                  80
Asp Phe Ala Val Tyr Phe Cys Gln Thr Tyr Gly Gly Ser Ser Tyr Thr
                85                  90                  95
Phe Gly Gln Gly Asn Lys Leu Asp Ile Arg Arg
            100                 105


<210> 123
<211> 126
<212> PRT
<213> Artificial Sequence
```

<220>
<223> Synthesized

<400> 123
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1   5   10   15
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
            20   25   30
Phe Val Leu His Trp Ala Arg Gln Ala Pro Gly His Arg Pro Glu Trp
        35   40   45
Met Gly Trp Ile Asn Pro Ala Asn Gly Val Thr Glu Ile Pro Pro Lys
    50   55   60
Phe Gln Asp Arg Val Ser Leu Thr Arg Asp Thr Ser Ala Gly Thr Val
65   70   75   80
Tyr Leu Glu Leu Thr Asn Leu Arg Phe Ala Asp Thr Ala Val Tyr Tyr
                85   90   95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Asp Ser Pro Gln Asp Asn
            100   105   110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val
        115   120   125

<210> 124
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 124
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1   5   10   15
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
            20   25   30
Phe Val Leu His Trp Ala Arg Gln Ala Pro Gly His Arg Pro Glu Trp
        35   40   45
Met Gly Trp Ile Asn Pro Ala Asn Gly Val Thr Glu Ile Ser Pro Lys
    50   55   60
Phe Gln Asp Arg Val Ser Leu Thr Gly Asp Thr Ser Ala Ser Thr Val
65   70   75   80
Tyr Leu Glu Leu Arg Asn Leu Arg Phe Ala Asp Thr Ala Val Tyr Tyr
                85   90   95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Asp Ser Pro Gln Asp Asn
            100   105   110
Tyr Tyr Met Asp Val Trp Gly Arg Gly Thr Thr Val Thr
        115   120   125

<210> 125
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 125
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1   5   10   15
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
            20   25   30

```
Phe Val Leu His Trp Ala Arg Gln Ala Pro Gly His Arg Pro Glu Trp
        35                  40                  45
Met Gly Trp Ile Asn Pro Ala Asn Gly Val Thr Glu Ile Ser Pro Lys
    50                  55                  60
Phe Gln Asp Arg Val Ser Leu Thr Gly Asp Thr Ser Ala Ser Thr Val
65                  70                  75                  80
Tyr Leu Glu Leu Arg Ser Leu Arg Phe Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Asp Ser Pro Gln Asp Asn
            100                 105                 110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val
        115                 120
```

<210> 126
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 126

```
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1               5                  10                  15
Ala Ser Val Lys Ile Ser Cys Gln Ala Ser Gly Tyr Arg Phe Thr Asn
            20                  25                  30
Phe Val Leu His Trp Ala Arg Gln Ala Pro Gly Gln Arg Pro Glu Trp
        35                  40                  45
Met Gly Trp Phe Asn Pro Ala Asn Gly Ile Lys Glu Ile Ser Pro Lys
    50                  55                  60
Phe Gln Asp Arg Val Ser Phe Thr Gly Asp Thr Ser Ala Ser Thr Ala
65                  70                  75                  80
Tyr Val Glu Leu Arg Asn Leu Arg Ser Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95
Cys Ala Arg Val Gly Pro Trp Thr Trp Asp Asp Ser Pro Gln Asp Asn
            100                 105                 110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val
        115                 120
```

<210> 127
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 127

```
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1               5                  10                  15
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
            20                  25                  30
Phe Val Leu His Trp Ala Arg Gln Ala Pro Gly His Arg Pro Glu Trp
        35                  40                  45
Met Gly Trp Ile Asn Pro Ala Asn Gly Val Thr Glu Ile Ser Pro Lys
    50                  55                  60
Phe Gln Asp Arg Val Ser Leu Thr Gly Asp Thr Ser Ala Ser Thr Val
65                  70                  75                  80
Tyr Leu Glu Leu Arg Asn Leu Arg Phe Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Asp Phe Pro Gln Asp Asn
```

100 105 110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val
115 120

<210> 128
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 128
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
1 5 10 15
Ala Ser Val Lys Leu Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
20 25 30
Phe Val Leu His Trp Ala Arg Gln Ala Pro Gly His Arg Pro Glu Trp
35 40 45
Met Gly Trp Ile Asn Pro Ala Asn Gly Val Thr Glu Ile Ser Pro Lys
50 55 60
Phe Gln Asp Arg Val Ser Leu Thr Gly Asp Thr Ser Ala Ser Thr Val
65 70 75 80
Tyr Leu Glu Leu Arg Asn Leu Arg Phe Ala Asp Thr Ala Val Tyr Tyr
85 90 95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Asp Ser Pro Gln Asp Asn
100 105 110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr
115 120 125

<210> 129
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 129
Gln Val Lys Leu Leu Glu Gln Ser Gly Thr Glu Val Lys Lys Pro Gly
1 5 10 15
Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Arg Phe Thr Asn
20 25 30
Phe Pro Leu His Trp Val Arg Gln Ala Pro Gly Gln Arg Pro Glu Trp
35 40 45
Met Gly Trp Ile Lys Ile Val Asn Gly Glu Lys Lys Tyr Ser Gln Lys
50 55 60
Phe Val Asp Arg Val Thr Phe Thr Gly Asp Thr Ser Ala Asn Thr Ala
65 70 75 80
Tyr Met Glu Val Arg Gly Leu Arg Ser Ala Asp Thr Ala Thr Tyr Tyr
85 90 95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Met Asp Pro Gln Ala Asn
100 105 110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr
115 120 125

<210> 130
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 130
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1   5   10   15
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
            20   25   30
Phe Val Ile His Trp Val Arg Gln Ala Pro Gly Gln Arg Phe Glu Trp
        35   40   45
Met Gly Trp Ile Asn Pro Tyr Asn Gly Asn Lys Glu Phe Ser Ala Lys
    50   55   60
Phe Arg Asp Arg Val Thr Phe Thr Ala Asp Thr Asp Ala Asn Thr Ala
65   70   75   80
Tyr Met Glu Leu Arg Ser Leu Arg Ser Ala Asp Thr Ala Ile Tyr Tyr
                85   90   95
Cys Ala Arg Val Gly Pro Tyr Thr Trp Asp Asp Ser Pro Gln Asp Asn
            100   105   110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val
        115   120

<210> 131
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 131
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1   5   10   15
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
            20   25   30
Phe Val Leu His Trp Ala Arg Gln Ala Pro Thr Gln Asp Leu Glu Trp
        35   40   45
Met Gly Trp Ile Asn Pro Ala Asn Gly Val Lys Glu Ile Ser Pro Lys
    50   55   60
Phe Gln Asp Arg Val Ser Leu Thr Gly Asp Thr Ser Ala Ser Thr Val
65   70   75   80
Tyr Leu Glu Leu Arg Ser Leu Arg Phe Ala Asp Thr Ala Val Tyr Tyr
                85   90   95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Asp Ser Pro Gln Asp Asn
            100   105   110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val
        115   120

<210> 132
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 132
Gln Val Lys Leu Leu Glu Gln Ser Gly Ala Glu Val Lys Lys Pro Gly
 1   5   10   15
Ala Ser Val Lys Val Ser Cys Gln Ala Ser Gly Tyr Arg Phe Ser Asn
            20   25   30

```
Phe Val Leu His Trp Ala Arg Gln Ala Pro Gly His Arg Pro Glu Trp
        35                  40                  45
Met Gly Trp Ile Asn Pro Ala Asn Gly Val Thr Glu Ile Pro Pro Lys
    50                  55                  60
Phe Gln Asp Arg Val Ser Leu Thr Arg Asp Thr Ser Ala Gly Thr Val
65                  70                  75                  80
Tyr Leu Glu Leu Thr Asn Leu Arg Phe Ala Asp Thr Ala Val Tyr Tyr
                85                  90                  95
Cys Ala Arg Val Gly Glu Trp Thr Trp Asp Asp Ser Pro Gln Asp Asn
            100                 105                 110
Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val
        115                 120
```

<210> 133
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 133
tcgagggtcg gtcggtctct agacggtcgg tcggtca 37

<210> 134
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 134
ctagtgaccg accgaccgtc tagagaccga ccgaccc 37

<210> 135
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 135
cggtcggtcg gtcctcgagg gtcggtcggt ct 32

<210> 136
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 136
ctagagaccg accgaccctc gaggaccgac cgaccgagct 40

<210> 137
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 137
caaggagaca ggatccatga aatac 25

<210> 138
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 138
agggcgaatt ggatcccggg ccccc 25

<210> 139
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 139
ctagtcatca tcatcatcat taagctagc 29

<210> 140
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 140
ctaggctagc ttaatgatga tgatgatga 29

<210> 141
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<221> VARIANT
<222> 1
<223> Xaa = Any Amino Acid

<400> 141
Xaa Ser Ile Ser Ile Gly Pro Gly Arg Ala Phe Tyr Thr Gly Glx Cys
1 5 10 15

<210> 142
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 142
Leu Leu Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu Thr Leu Ser
 1   5   10   15
Leu Thr Cys Thr Val Ser Gly Gly Ser Leu Ser Ser Phe Asp Trp Asn
            20   25   30
Trp Ile Arg Gln Pro Ala Gly Lys Gly Leu Glu Trp Ile Gly Arg Ile
        35   40   45
Tyr Pro Ser Gly Asn Thr His Tyr Asn Pro Ser Leu Arg Ser Arg Val
    50   55   60
Thr Met Ser Arg Asp Thr Ser Lys Asn Gln Phe Ser Val Lys Leu Thr
65   70   75   80
Ser Val Thr Ala Ala Asp Thr Ala Leu Tyr Tyr Cys Ala Arg Glu Asn
                85   90   95
Thr Gly Arg Thr Ile Glu Glu Ile Gly Asn Phe Phe Asp Ile Trp Gly
            100   105   110
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115   120   125

<210> 143
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 143
Leu Leu Lys Ser Gly Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Val Ile Ser Ala Phe Ser Phe Ser Gly Tyr Asn Ile Asn
            20   25   30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ser Ser Ile
        35   40   45
Ser Met Ser Thr Gly Ser Leu Ser Tyr Ala Asp Ser Met Lys Gly Arg
    50   55   60
Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Val Tyr Leu Glu Met
65   70   75   80
Ser Ser Leu Thr Ala Glu Asp Thr Ala Met Tyr Tyr Cys Ala Ala Arg
                85   90   95
Thr Pro Leu Val Gly Arg Ala Leu Asp Ile Trp Gly Gln Gly Thr Val
            100   105   110
Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115   120

<210> 144
<211> 132
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 144
Leu Leu Glu Ser Gly Gly Gly Leu Val Lys Pro Gly Gly Ser Leu Arg
 1   5   10   15
Leu Ser Cys Ser Ala Ser Gly Phe Thr Phe Ser Ser Tyr Gly Met Asn
            20   25   30
Trp Val Arg Gln Ala Pro Gly Lys Gly Pro Glu Trp Val Ala Tyr Ile
        35   40   45
Ser Ser Ser Arg Lys Tyr Thr Glu Tyr Ala Asp Ser Val Lys Gly Arg

```
    50                  55                  60
Phe Thr Ile Ser Arg Glu Asn Ala Lys Tyr Ser Val Phe Leu Gln Leu
65                  70                  75                  80
Asp Ser Leu Thr Ala Glu Asp Thr Ala Ile Tyr Tyr Cys Ala Arg Gly
                85                  90                  95
Arg Asp Phe Tyr Ser Gly Phe Gly Arg Arg Asp Asp Phe His Leu His
            100                 105                 110
Tyr Met Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser Ala
        115                 120                 125
Ser Thr Lys Gly
    130
```

<210> 145
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 145

```
Leu Leu Glu Gln Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu
 1               5                  10                  15
Arg Ile Ser Cys Val Ala Ser Gly Asp Ile Phe Tyr Ser Tyr Ala Met
            20                  25                  30
Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Ser
        35                  40                  45
Ile Ser Gly Thr Gly Gly Ser Asn Tyr Tyr Ala Asp Ser Val Lys Gly
    50                  55                  60
Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Ser Thr Leu Tyr Leu Gln
65                  70                  75                  80
Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Leu Tyr Tyr Cys Ala Arg
                85                  90                  95
Asp Arg Gly Pro Arg Ile Gly Ile Arg Gly Trp Phe Asp Ser Trp Gly
            100                 105                 110
Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly
        115                 120                 125
```

<210> 146
<211> 124
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 146

```
Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg
 1               5                  10                  15
Leu Ser Cys Ala Ala Ser Gly Phe Leu Tyr Ser Ser Phe Ala Met Ser
            20                  25                  30
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Ala Trp Val Ser Thr Ile
        35                  40                  45
Ser Ala Ser Gly Gly Ser Thr Lys Tyr Ala Asp Ser Val Lys Gly Arg
    50                  55                  60
Phe Ile Ile Ser Arg Asp Asn Ser Lys Asn Thr Ile Tyr Leu Gln Met
65                  70                  75                  80
Asp Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Asn
                85                  90                  95
Phe Arg Ala Phe Ala Arg Asp Pro Trp Gly Asp Trp Gly Gln Gly Thr
            100                 105                 110
```

Leu Val Thr Val Ser Ser Ala Ser Ala Ser Thr Lys
115 120

<210> 147
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 147
Met Ala Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15
Glu Arg Val Ile Val Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Asn
20 25 30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45
Ile Tyr Gly Ala Ser Asn Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Gly
85 90 95
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr
100 105

<210> 148
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 148
Met Ala Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15
Glu Arg Ala Thr Phe Ser Cys Arg Ser Ser His Ser Ile His Thr Arg
20 25 30
Arg Val Ala Trp Tyr Gln His Lys Pro Gly Gln Ala Pro Arg Leu Val
35 40 45
Ile His Gly Val Ser Asn Arg Ala Ser Gly Ile Ser Asp Arg Phe Ser
50 55 60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Arg Val Glu
65 70 75 80
Pro Glu Asp Phe Ala Leu Tyr Tyr Cys Gln Val Tyr Gly Ala Ser Ser
85 90 95
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Arg Lys Arg Thr Val Val
100 105 110

<210> 149
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 149

```
Met Ala Glu Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
 1               5                  10                  15
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Asn Gly
            20                  25                  30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45
Ile Tyr Gly Ala Ser Thr Arg Ala Thr Asp Ile Pro Asp Arg Phe Ser
    50                  55                  60
Gly Ser Gly Ser Gly Ala Asp Phe Thr Leu Ala Ile Ser Arg Leu Glu
65                  70                  75                  80
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Ala Gly Ser His
                85                  90                  95
Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
            100                 105                 110


<210> 150
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 150
Met Ala Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1               5                  10                  15
Asp Arg Val Thr Ile Thr Cys Arg Pro Ser Gln Gly Ile Gly Arg Phe
            20                  25                  30
Phe Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Asn Leu Leu Ile
        35                  40                  45
Tyr Ala Ala Asp Ile Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80
Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Tyr Ser Thr Pro Tyr
                85                  90                  95
Thr Phe Gly Gln Gly Thr Arg Leu Asp Ile Lys Arg Thr Val Ala
            100                 105                 110


<210> 151
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 151
Met Ala Glu Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1               5                  10                  15
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Val Ser Ser Ser
            20                  25                  30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Val
        35                  40                  45
Ile Phe Gly Ala Tyr Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
                85                  90                  95
Ile Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys Arg Thr Val Ala
```

100 105 110

<210> 152
<211> 729
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<221> CDS
<222> (9)...(716)

<400> 152
agcttacc atg ggt gtg ccc act cag gtc ctg ggg ttg ctg ctg ctg tgg 50
Met Gly Val Pro Thr Gln Val Leu Gly Leu Leu Leu Leu Trp
1 5 10

ctt aca gat gcc aga tgt gag atc gtt ctc acg cag tct cca ggc acc 98
Leu Thr Asp Ala Arg Cys Glu Ile Val Leu Thr Gln Ser Pro Gly Thr
15 20 25 30

ctg tct ctg tct cca ggg gaa aga gcc acc ttc tcc tgt agg tcc agt 146
Leu Ser Leu Ser Pro Gly Glu Arg Ala Thr Phe Ser Cys Arg Ser Ser
35 40 45

cac agc att cgc agc cgc cgc gta gcc tgg tac cag cac aaa cct ggc 194
His Ser Ile Arg Ser Arg Arg Val Ala Trp Tyr Gln His Lys Pro Gly
50 55 60

cag gct cca agg ctg gtc ata cat ggt gtt tcc aat agg gcc tct ggc 242
Gln Ala Pro Arg Leu Val Ile His Gly Val Ser Asn Arg Ala Ser Gly
65 70 75

atc tca gac agg ttc agc ggc agt ggg tct ggg aca gac ttc act ctc 290
Ile Ser Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
80 85 90

acc atc acc aga gtg gag cct gaa gac ttt gca ctg tac tac tgt cag 338
Thr Ile Thr Arg Val Glu Pro Glu Asp Phe Ala Leu Tyr Tyr Cys Gln
95 100 105 110

gtc tat ggt gcc tcc tcg tac act ttt ggc cag ggg acc aaa ctg gag 386
Val Tyr Gly Ala Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu
115 120 125

agg aaa cga act gtg cct gca cca tct gtc ttc atc ttc ccg cca tct 434
Arg Lys Arg Thr Val Pro Ala Pro Ser Val Phe Ile Phe Pro Pro Ser
130 135 140

gat gag cag ttg aaa tct ggg act gcc tct gtt gtg tgc ctg ctg aat 482
Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn
145 150 155

aac ttc tat ccc aga gag gcc aaa gta cag tgg aag gtg gat aac gcc 530
Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala
160 165 170

ctc caa tcg ggt aac tcc cag gag agt gtc aca gag cag gac agc aag 578
Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys
175 180 185 190

```
gac agc acc tac agc ctc agc agc acc ctg acg ctg agc aaa gca gac   626
Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp
                195                 200                 205

tac gag aaa cac aaa gtc tac gcc tgc gaa gtc acc cat cag ggc ctg   674
Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu
            210                 215                 220

agt tcg ccc gtc aca aag agc ttc aac agg gga gag tgt taa           716
Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys  *
        225                 230                 235

ttctagagaa ttc                                                   729
```

<210> 153
<211> 235
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 153

```
Met Gly Val Pro Thr Gln Val Leu Gly Leu Leu Leu Leu Trp Leu Thr
 1               5                  10                  15
Asp Ala Arg Cys Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser
            20                  25                  30
Leu Ser Pro Gly Glu Arg Ala Thr Phe Ser Cys Arg Ser Ser His Ser
        35                  40                  45
Ile Arg Ser Arg Arg Val Ala Trp Tyr Gln His Lys Pro Gly Gln Ala
    50                  55                  60
Pro Arg Leu Val Ile His Gly Val Ser Asn Arg Ala Ser Gly Ile Ser
65                  70                  75                  80
Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
                85                  90                  95
Thr Arg Val Glu Pro Glu Asp Phe Ala Leu Tyr Tyr Cys Gln Val Tyr
            100                 105                 110
Gly Ala Ser Ser Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu Arg Lys
        115                 120                 125
Arg Thr Val Pro Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
    130                 135                 140
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
145                 150                 155                 160
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
                165                 170                 175
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
            180                 185                 190
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
        195                 200                 205
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
    210                 215                 220
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
225                 230                 235
```

<210> 154
<211> 3282
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<221> CDS
<222> (15)...(455)

<400> 154

```
aattcgccgc cacc atg gaa tgg agc tgg gtc ttt ctc ttc ttc ctg tca   50
                Met Glu Trp Ser Trp Val Phe Leu Phe Phe Leu Ser
                 1               5                  10

gta act aca ggt gtc cac tcc cag gtt cag ctg gtt cag tcc ggg gct   98
Val Thr Thr Gly Val His Ser Gln Val Gln Leu Val Gln Ser Gly Ala
         15                  20                  25

gag gtg aag aag cct ggg gcc tca gtg aag gtt tct tgt cag gct tct   146
Glu Val Lys Lys Pro Gly Ala Ser Val Lys Val Ser Cys Gln Ala Ser
     30                  35                  40

gga tac aga ttc agt aac ttt gtt att cat tgg gtg cgc cag gcc ccc   194
Gly Tyr Arg Phe Ser Asn Phe Val Ile His Trp Val Arg Gln Ala Pro
 45                  50                  55                  60

gga cag agg ttt gag tgg atg gga tgg atc aat cct tac aac gga aac   242
Gly Gln Arg Phe Glu Trp Met Gly Trp Ile Asn Pro Tyr Asn Gly Asn
                 65                  70                  75

aaa gaa ttt tca gcg aag ttc cag gac aga gtc acc ttt acc gcg gac   290
Lys Glu Phe Ser Ala Lys Phe Gln Asp Arg Val Thr Phe Thr Ala Asp
             80                  85                  90

aca tcc gcg aac aca gcc tac atg gag ttg agg agc ctc agg tct gca   338
Thr Ser Ala Asn Thr Ala Tyr Met Glu Leu Arg Ser Leu Arg Ser Ala
         95                  100                 105

gac acg gct gtt tat tat tgt gcg aga gtg ggg cca tat agt tgg gat   386
Asp Thr Ala Val Tyr Tyr Cys Ala Arg Val Gly Pro Tyr Ser Trp Asp
    110                 115                 120

gat tct ccc cag gac aat tat tat atg gac gtc tgg ggc aaa gga acc   434
Asp Ser Pro Gln Asp Asn Tyr Tyr Met Asp Val Trp Gly Lys Gly Thr
125                 130                 135                 140

acg gtc atc gtg agc tca gct tccaccaagg gcccatcggt cttccccctg      485
Thr Val Ile Val Ser Ser Ala
                145
```

```
gcaccctcct ccaagagcac ctctgggggc acagcggccc tgggctgcct ggtcaaggac 545
tacttccccg aaccggtgac ggtgtcgtgg aactcaggcg ccctgaccag cggcgtgcac 605
accttccccgg ctgtcctaca gtcctcagga ctctactccc tcagcagcgt ggtgaccgtg 665
ccctccagca gcttgggcac ccagacctac atctgcaacg tgaatcacaa gcccagcaac 725
accaaggtgg acaagaaagt tggtgagagg ccagcacagg gagggagggt gtctgctgga 785
agccaggctc agcgctcctg cctggacgca tcccggctat gcagccccag tccagggcag 845
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